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AGO, d;/a ltr, 29 Apr 1980

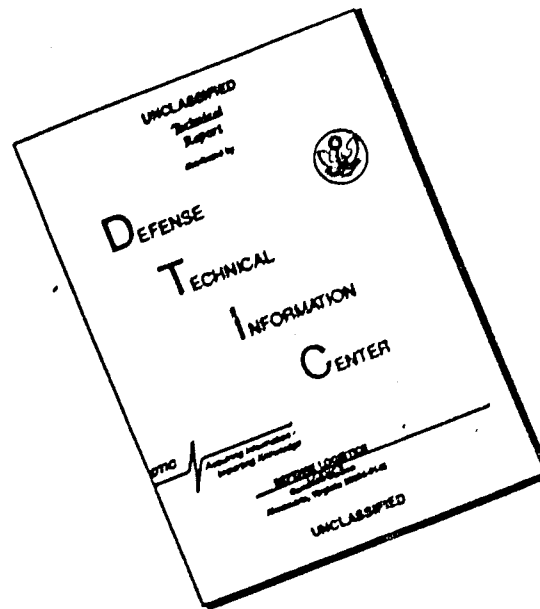
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IN REPLY REFER TO

AGAM-P (M) (8 May 67) FOR OT

10 May 1967

SUBJECT: Operational Report - Lessons Learned, Headquarters,  
168th Engineer Combat Battalion

TO: SEE DISTRIBUTION

1. Forwarded as inclosure is Operational Report - Lessons Learned, Headquarters, 168th Engineer Combat Battalion for quarterly period ending 31 January 1967. Information contained in this report should be reviewed and evaluated by CDC in accordance with paragraph 6f of AR 1-19 and by CONARC in accordance with paragraph 6c and d of AR 1-19. Evaluations and corrective actions should be reported to ACSFOR OT within 90 days of receipt of covering letter.

2. Information contained in this report is provided to the Commandants of the Service Schools to insure appropriate benefits in the future from lessons learned during current operations, and may be adapted for use in developing training material.

BY ORDER OF THE SECRETARY OF THE ARMY:

*Kenneth G. Wickham*

1 Incl  
as

KENNETH G. WICKHAM  
Major General, USA  
The Adjutant General

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(Continued on page 2)

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HEADQUARTERS  
168 Engineer Combat Battalion  
APO US Forces 96289

EBA-CO

14 February 1967

SUBJECT: Operational Report-Lessons Learned (RCS CSFOR-65), for the  
Quarterly Period Ending 31 January 1967

THRU: Commanding Officer  
79th Engineer Group  
APO US Forces 96491

Commanding General  
United States Army Engineer Command, Vietnam (P)  
ATTN: AVCC-BC  
APO US Forces 96491

Commanding General  
United States Army, Vietnam  
ATTN: AVC-DC  
APO US Forces 96307

Commander-in-Chief  
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### Section 1, Significant Organization or Unit Activities

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1. GENERAL, During the period 1 November 1966-31 January 1967, the 168th Engineer Combat Battalion retained its primary general support mission of cantonment construction. The majority of the construction effort was directed toward the 1st Infantry Division Base Camps at Di An and Phuoc Vinh. The battalion operated on a 7 day, 75 hour week, with Sunday morning devoted to maintenance. The construction effort included the erection of mess halls, administrative facilities and troop billets at Di An and at Phuoc Vinh, improvement of the C-130 airfield at Phuoc Vinh, and construction of a (40' x 60') Dial Central building at Di An. On 1 December, the 557th Engineer Company (Light Equipment) was attached to the battalion. This attachment greatly increased the capabilities of the battalion, while at the same time increasing its span of control over external commitments. Using the organic and augmented equipment of the Light Equipment Company, supplemented by battalion personnel and equipment resources, the Xom Tam quarry and laterite pit was expanded and fully developed. During the month of January, increased emphasis was placed on combat support operations. This important new role involved all elements of the battalion to some degree, and culminated in a major battalion commitment in direct support of the 1st Infantry Division during Operations Niagara Falls, Cedar Falls, and Lam Son II. To summarize briefly, the operations of the battalion during this quarter were diversified, challenging, and successful. The productivity and morale of all assigned units remained high, and the battalion is well prepared for any new combat support or construction missions which may be assigned in the coming quarter.

### 2. COMMAND

The battalion was commanded throughout the entire period by Lieutenant Colonel Edwin F. Pelosky. However, personnel were shifted in almost all of the remaining key positions. Captain John D. Simpson moved from S-3 to Executive Officer; Captain Stephen E. Smallwood moved into the S-3 position from Company C, and Captain Jerry Reagan moved from S-2 to Company C. Captain Harry Jefferson became S-2. Captain George Davenport moved from Company A to the S-1 position; and he was replaced by Captain Donwell D. Whitley, who had previously been the battalion maintenance officer. Captain Dwayne G. Lee of Company B, Captain Gaylin Thomas of Headquarters Company, and Captain John Kammerdiener of the 557th Engineer Company (Light Equipment) remained in command positions. A current battalion organization chart is included as Inclosure 1. In a further point of significant command interest, the battalion was placed in direct support of the 1st Infantry Division for the first time on 6 January 1967, and remained in this status for the duration of Operation Cedar Falls and to the end of this reporting period.

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### 3. PERSONNEL, ADMINISTRATION, MORALE AND DISCIPLINE

The battalion administrative workload was somewhat increased by the attachment of the 557th Engineer Company (Light Equipment). The pay clerk and records clerk of this company were integrated into the battalion personnel section, and all administrative functions of the Light Equipment Company are now channeled through this section. During this period the unit APO was changed from 96227 to 96289, but the value of this change remains to be proven. A movie is provided nightly for the entertainment of the men of the battalion in the chapel/classroom, and three clubs have been constructed; two for enlisted men and one for non-commissioned officers. During this quarter the Sundry Fund which operates the clubs became solvent and is now renovating each club, to include purchase of new furniture and two stereo tape recorders for entertainment. A unit fund has been established in each company through the USAFV Special Services Division and funds are now available for individual unit improvement.

### 4. INTELLIGENCE AND COUNTERINTELLIGENCE

The S-2 Section of the battalion performed functions that ranged from route and area reconnaissance to tunnel exploration and destruction. A large reconnaissance mission, involving detailed bridge site, ferry site and route reconnaissance was detailed to the S-2 Section, and teams were dispatched to five major bridges to gather data for contingency plans. Further, the S-2 Section was given staff responsibility for reinforcing the battalion defensive perimeter. This task involved the addition of more bunkers, fox holes, tactical wire, claymore mines, hush flares, and fugas devices to the perimeter defenses to provide a main line of defense impenetrable by any small unit, with a secondary line for possible use during heavier engagements. During Operation Cedar Falls, the Intelligence Section provided tunnel exploration and demolition teams that materially contributed to the outstanding success of the operation. The primary method of destroying tunnels was the use of acetelyne gas, pumped in by generators and ignited by explosive charges. The teams also experimented successfully with conventional demolitions, and a combination of the two destruction systems. On the administrative side, a darkroom was constructed by the section to facilitate efficient dissemination of photographic intelligence. This has proven especially valuable for reconnaissance requirements.

### 5. PLANS, OPERATIONS, AND TRAINING

a. Plans: In addition to planning and weekly supervision of platoon-sized ambush patrols in areas adjacent to the Di An cantonment, the battalion S-2 Section conducted a large scale reconnaissance of selected bridge sites to establish contingency plans for use in the event that any major bridges are destroyed. A contingency plan for each of these areas was developed by the S-3 Section, to include alternate plans and engineering estimates of bridge construction at each site.

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### b. Operations:

5 (1) Combat Support: During the quarter this battalion experienced a sharp increase in combat support activities, including participation in four major tactical operations and intensification of local security missions. All told, almost 15% of the battalion's effort was expended in such fashion. All subordinate units participated to some degree, and the maximum commitment involved over two-thirds of the battalion for a short duration. Major combat support operations included;

#### (a) Operation Attleboro ( 5 November to 19 November 1966)

An element of Company B plus attached equipment from Headquarters Company and 557th Light Equipment Company were airlifted to II Field Forces, Vietnam forward headquarters in Dau Tieng to repair and maintain the badly rutted airstrip at that location. Working around the clock, the unit repaired the surface-treated runway using sifted laterite and asphalt binder material. Heavy rainfall hindered progress for several nights, and the heavy volume of air traffic, which often exceeded 100 sorties of CV2, C123, and C130 aircraft daily, presented some problems. However, the strip was successfully kept open throughout the duration of the operation.

#### (b) Operation Niagara Falls (5-8 January 1967):

As a prelude to Operation Cedar Falls, Headquarters Company B (-), a platoon from Company C, equipment and maintenance elements from Headquarters Company, and attached teams from 588th Engineer Battalion, 86th Engineer Battalion, 27th Engineer Battalion, 169th Engineer Battalion and 188th Maintenance Battalion moved to the Cau Binh jungle for two days of intensive clearing operations. In the course of this operation, approximately one square mile of medium to heavy jungle was cleared, windrowed, and subsequently burned. On the last day, six artillery direct fire gun positions and fields of fire were cleared along the Thi Tinh River adjacent to the Iron Triangle in preparation for Operation Cedar Falls.

#### (c) Operation Cedar Falls (9-28 January 1967):

The battalion task force, including four Rome plows and 34 bulldozers, was placed in direct support of 1st Infantry Division during the month of January 1967. Working in conjunction with 1st Engineer Battalion, the task force supported 2nd and 3rd Brigades of 1st Infantry Division, 173rd Airborne Brigade, and 11th Armored Cavalry Regiment. Company B controlled one of four dozer teams, and generally was responsible for jungle clearing, road repair, mine sweeping, tunnel destruction, and other combat engineer tasks along the western edge of the Iron Triangle. Other dozer teams worked with A, B, and D Companies of the 1st Engineer Battalion cutting swaths through the jungle, clearing landing zones, and levelling Viet Cong fortifications, villages, and base camps throughout

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the Iron Triangle area from Ben Sue to the confluence of the Thi Tinh and Saigon Rivers. Approximately 2,500 acres of jungle were cleared in the course of the operation, and over 5,000 linear meters of tunnels were destroyed. Six villages, one town, and 12 base camps were also levelled by the dozer teams. In all, 14 members of the task force were wounded by hostile action. Twenty-two Viet Cong ralliers were taken, and eight were killed by members of the tunnel destruction teams. The operation achieved great success in denying future enemy use of a former Viet Cong stronghold. It also marked a notable innovation in the employment of non-divisional engineers in a direct combat support role. Infantry and armor commanders who were accompanied in the assault by bulldozer teams were unanimous in their praise of the joint maneuver concept. Further, the engineers learned many lessons regarding efficient employment of massed dozers, including the paramount importance of intensive maintenance in a field environment. The operation was eminently successful from the viewpoint of the tactical units involved, and it set the stage for continued close cooperation between engineer task forces and assault elements in future ventures against Viet Cong strongholds. In the aftermath, this headquarters is conducting a detailed analysis of equipment, techniques, and task organizations for possible future employment in similar operations.

### (d) Operation Lam Son II (28 January to 12 February 1967)

Moving out of the Iron Triangle, the task force cleared the Trang Bung Bung jungle and Chan Long vicinity to prevent future Viet Cong use of these heavily wooded areas as mortar sites. A total of approximately 300 acres was cleared, and Routes 2A and 1A were opened between Route 13 and Hoa Loi, and Phu Loi and Chan Long respectively. Enemy mine warfare was intensive during this period. Four members of the task force were killed and two wounded by mines during the operation. In spite of these losses, the clearing progressed successfully, finding and destroying several base camps and tunnels in the process. On 11 February, the last elements of the task force closed in Di An, and all attached equipment was subsequently returned to its parent units.

(e) Local Security: Weekly platoon-sized ambush patrols were conducted at Di An under the control of the S-2. Security measures were intensified during the holiday season, and defenses were strengthened by the addition of bunkers and firing positions.

(f) Other Combat Support: On three occasions during the quarter, this battalion and 557th Light Equipment Company provided tractor-trailers, dump trucks and personnel to 1st Engineer Battalion in support of tactical operations. 557th Engineer Company also supported 27th Engineer Battalion at Gia Ray and in the Rice Bowl with dozers, graders, and other engineer equipment. Company C, 168th Engineer Battalion airlifted a trailer mounted asphalt distributor and a small detachment to the Quan Loi and Minh Thanh airfields on two separate occasions to prime the strips in preparation for forthcoming tactical

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7 operations. Finally, a commercial model backhoe from the Headquarters Equipment Section assisted the 86th Engineer Battalion in construction of a resettlement village for Vietnamese refugees evacuated from Ben Suo after Operation Cedar Falls.

(2) Cantonment Construction: During the past quarter, construction continued at Di An, Phuoc Vinh, Long Binh, and Bien Hoa. The battalion consistently outproduced comparable units, and earned many compliments from the using units.

(a) Di An: Companies A and B shared the construction workload at Di An Main Base and the 2nd Brigade "North 40" area. On the main base, production included: 400 linear feet of culvert; 14,000 square feet of messhalls; 36,000 square feet of troop billets; 10,000 square feet of administrative buildings; 4,000 square feet of post exchange facilities; and a 2,400 square foot Dial Central office which involved the most sophisticated construction yet undertaken by the battalion. At the close of the reporting period, the main base was approximately 70% completed. Construction accomplished for 2nd Brigade included: 27,000 square yards of roads; 10,000 linear feet of ditches; 2,000 linear feet of culverts; 170 shower heads; 27,000 square feet of messhalls; 63,000 square feet of billets; 10,000 square feet of administrative buildings, and 5,000 square feet of other miscellaneous structures. The "North 40" is now 57% complete. The dust control program at Di An was also intensified during the quarter. In all, over 140,000 square yards of roads, airfields, and helipads were peneprimed.

(b) Phuoc Vinh: The 1st Brigade cantonment area was constructed by Company C. Construction data for this quarter included: 900 linear feet of culvert; a 1,000 square foot dispensary; 67,000 square feet of billets; 63,000 square feet of administrative buildings; an 8,000 square foot Service Club; 1,800 square foot chapel; 1,000 square foot post office; 1,000 square foot Red Cross facility, and 14,000 square feet of class rooms. The cantonment at Phuoc Vinh is now 58% complete. In addition, Company C began a project to improve the Phuoc Vinh airfield by constructing new taxiways and helipads. The western taxiway has been completed, and 24 new helipads have been constructed as of the close of the reporting period.

(c) Bien Hoa: During November, the 1st Platoon (reinforced) of 557th Light Equipment Company was engaged in construction of a C-130 taxiway and parking apron at Bien Hoa airfield. The project included clearing, compacting, and hauling 10,000 cubic yards of laterite into a 200,000 square foot area.

(d) Xom Tam: 557th Engineer Company devoted a major portion of its efforts to development of the Xom Tam quarry and laterite pit. Upon attachment to this battalion, the unit assumed responsibility for the entire quarry/pit complex, and a large element from the company moved to Xom Tam from Long Binh on a permanent basis. 1st Infantry

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Division provided a security platoon to reinforce perimeter defenses, which were unsuccessfully probed by the Viet Cong on several occasions. Defensive positions, a mess hall, motor pool, and troop billets were constructed during the quarter, and three 75 ton per hour rock crushers were positioned behind a newly constructed retaining wall adjacent to the quarry. A shortage of qualified quarrying personnel caused temporary operational difficulties, but these were successfully overcome by on-the-job training. During succeeding months, the 557th Engineer Company also trained quarry personnel from other units in 79th Group, and transferred one crusher, rock drills, and a 40 ton crane to begin new quarries. With two crushers operating, the quarrying operation has achieved production of 2,000 cubic yards of crushed rock per week. The laterite pit was also expanded greatly to accommodate up to 80 trucks daily hauling an average of 1,500 cubic yards per day to Di An and other nearby cantonments. Further improvements in the quarry/pit operation are currently under study, and several will be introduced during the coming quarter.

(e) Other Projects: Company A constructed a consolidated messhall for the 500th and 100th Engineer Companies in Long Binh during January 1967. Company B maintained the Di An-Long Binh bypass road on a continuing basis throughout the quarter. The 557th Light Equipment Company provided effective equipment support to all units in 79th Group in a wide variety of construction projects at Lai Khe, Phu Loi, Xuan Loo, Cu Chi, Tay Ninh, Bien Hoa, and Long Binh. In a rather unusual support mission, the company also supplied an air compressor and operators to the Royal Australian Engineers for a period of two months. This venture was apparently quite beneficial to the Australians, and the arrangements were very satisfactory to the United States personnel who participated.

c. Training: During December, the battalion conducted construction management courses three nights a week for key non-commissioned officers and junior lieutenants. These classes proved very useful in indoctrinating new supervisors in the techniques and quality of construction desired by the battalion. It is intended that such courses of instruction will be repeated in the future as deemed necessary to insure that quality and productivity remain high. A week-long period of intensified combat engineer training was conducted in January by each of the line companies prior to movement to the field for Operation Cedar Falls. Training in mine detection, demolition work, use of tactical wire, small unit tactics, clearing operations and other essential engineering subjects was covered. Other training within the battalion included the initial two day orientation for replacements covering basic military and engineering skills. This training is given before new arrivals are assigned to the companies, and is designed to insure that they are adequately prepared for the battalion's varied activities. Key officers and non-commissioned officers also participated in a Chinook rigging class, and in a 79th Group maintenance seminar.

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9 6. LOGISTICS. During the quarter, the S-4 Section hauled approximately 13,000 tons of construction supplies from Long Binh to Di An, a distance of ten miles, and about one third of that amount an average of 25 additional miles to outlying companies. The materials were hauled by organic low bed tractor-trailers, supported by bridge trucks provided by the 100th Float Bridge Company as needed and available. Critical shortages of 2" x 6" and 2" x 4" lumber occurred sporadically, and on several occasions construction was delayed awaiting these materials. On three occasions, the road from Di An to Phuoc Vinh was opened by combat elements of the 1st Infantry Division, and kept open for a period of 4 to 7 days. The 1st Brigade conducted armed resupply convoys, and an entire march unit of each convoy was allocated to this battalion for transport of construction materials. This serial was comprised of vehicles organic to the battalion, and others supplied by 79th Engineer Group. During December, the engineer element reached a new high of 150 vehicles for three runs each, carrying a total of 1,500 tons of supplies to permit continued construction at Phuoc Vinh for about two months.

7. FORCE DEVELOPMENT. During this quarter the battalion experimented with several new troop and equipment employment concepts. For jungle clearing operations, composite dozer teams were formed including 6 to 12 bulldozers, a contact truck, an air compressor for blowing out radiators, operators, mechanics, and supervisory personnel. As a backup maintenance force, organic equipment and mechanics from the battalion and Light Equipment Company were supplemented by an attached field maintenance team, thereby permitting third echelon repairs to be accomplished in the field. Also in connection with recent combat support operations, it was discovered that a non-divisional combat battalion is hard pressed to conduct large scale tactical operations and normal cantonment construction missions concurrently because of insufficient personnel, communications, and transportation capabilities. Possible solutions are presently being considered by the unit, and some specific problems and alternatives are discussed in greater detail in Section 2 of this report.

### 8. COMMAND MANAGEMENT.

a. Sundry Fund: During the reporting period, the battalion Sundry Fund, which consolidates the funds of officers, non-commissioned officers and enlisted men's clubs, was audited by a USARV Audit Team. As a result of this audit, the fund was properly systematized and began operating in accordance with the pertinent regulations. Despite rather extensive purchases for the clubs, it has continued to operate in the black and consistent efforts are being made to return all profits to the members of the battalion in the form of club improvements, parties, and entertainment.

b. Imprest Fund: The Imprest Fund was utilized to purchase items which were unavailable through normal supply channels and yet essential for the battalion to perform its mission. Critical repair parts, construction tools for the Vietnamese laborers, special electrical

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materials, and fire aggregate for isolated ~~Phuoc Vinh~~ are a few of the items purchased locally with this fund. Approximately \$5,600 was spent during the period. 10

9. INSPECTOR GENERAL. During the period 14 to 18 November, 1966, the battalion was inspected by the USARV Inspector General team. The inspection team found that "the assigned missions of the 168th Engineer Battalion were being accomplished with a high degree of efficiency." It further determined that "the attitude, appearance, morale, and esprit de corps of all personnel were outstanding. All personnel appeared to be professionally competent and were enthusiastic in their desire to perform assigned duties in an outstanding manner." The battalion was also found to have no critical personnel or equipment shortages. Although the inspection was primarily one of records, administrative practices and files systems rather than equipment or operations, it was felt that the results were an accurate indication of the combat readiness of the battalion.

10. INFORMATION. During this period the battalion newspaper was printed every two weeks, except during the period when the battalion was in the field. The paper included sections reserved for events taking place within each company and information concerning the operational activities of the battalion. A program to increase the number of home town news releases, with special emphasis on awards given for the recent combat operations, is also being put into effect.

### 11. CIVIC AFFAIRS.

a. Di An: Through the Office of the Chaplain, and in conjunction with the Battalion Surgeon, aid has been given to two orphanages in the Di An area. A med-cap team provided by the battalion medical section visited each orphanage on a periodic basis and provided medical aid for the orphans. Food was obtained through the 1st Infantry Division G-5 and distributed to these orphanages. Also, a fund in excess of \$1,200.00 which was collected by the battalion chaplain will be donated to an orphanage near Saigon to assist in construction of a kitchen and mess hall.

b. Phuoc Vinh: Company C was active in assisting in construction of new facilities at a church-sponsored orphanage in the vicinity of Phuoc Vinh. Laterite was hauled to the site, engineering assistance was given and the obvious success of the project was a tribute to the outstanding efforts of Company C.

c. Chan Long: During this period, as a part of Operation Lam Son II, Company A of this battalion erected a playground for the children of Chan Long, to include see saws, swings, sand piles and a merry-go-round. This also was accomplished in conjunction with the Division G-5 as part of the Revolutionary Development Program.

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### Section 2, Part 1, Observations (Lessons Learned)

#### 1. PERSONNEL.

##### a. Indigenous Employees

ITEM: Cross-Training of skilled laborers.

DISCUSSION: The battalion employs over five hundred Vietnamese skilled workers on a permanent hire basis. During the reporting period, the supply of bricks became inadequate to keep the 80 permanent hire masons gainfully employed. While the last brick buildings were being constructed, efforts were made to retain these personnel within the battalion's employ, even though their special talents were temporarily not needed.

OBSERVATION: It was determined that these skilled laborers could adequately perform as carpenters, and continue to assist the battalion in fulfilling its construction mission. Additional carpentry tools were purchased and the masons smoothly transferred their talents to the construction of wooden tropical buildings. Later as the drainage network of the "North 40" area became more stable, the masons were used in the erection of rubble and concrete headwalls. Not only did this solution retain experienced personnel who are accustomed to working for American units, it also insured that a skilled labor force would be available in the future should any brick buildings be constructed.

##### b. Combat Support

ITEM: Personnel Rotation.

DISCUSSION: During a combat operation, with only part of a unit committed to combat support, morale problems inevitably occur. Internal friction may develop between those members in the unit who have been in combat and those who remain behind. Some individuals become more highly trained and skilled in combat operations, and because of this experience may tend to bear an unfair share of the work burden on subsequent operations. This becomes particularly serious when the situation suddenly requires the commitment of skilled individuals on short notice.

OBSERVATION: Periodic rotation of elements serving in combat support, with a squad sized element considered the smallest integral unit to be rotated, will achieve a more satisfactory distribution of the work load and more experience is gained for the unit. The construction time lost is compensated for by more experienced combat engineers.

#### 2. OPERATIONS.

##### a. Jungle Clearing

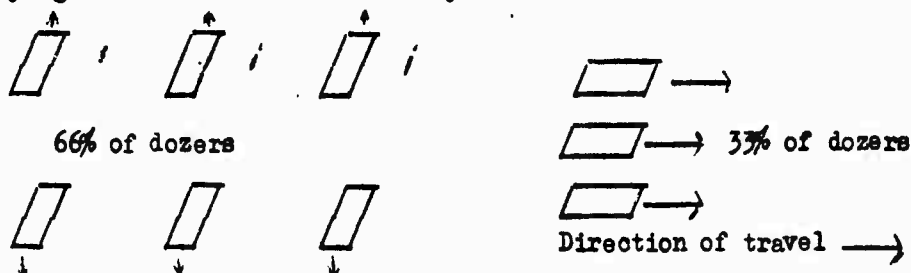
ITEM: Clearing of jungle with bulldozers.

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**DISCUSSION:** Using 6 or more dozers for clearing of heavy jungle presents some unique control problems. It is difficult to determine a means of employment whereby all the dozers are fully utilized, yet properly directed. 12

**OBSERVATION:** In Operation Cedar Falls, the following method of employing dozers was used effectively.



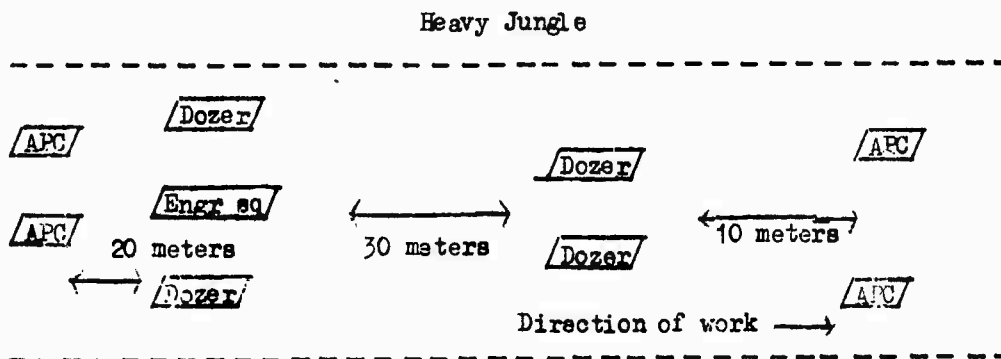
Use one third of the dozer effort to clear a path in the direction the swath is to be cut. Because of the difference in terrain and density of jungle, the dozers should not work in tandem, but should have about 2 to 3 feet between their blades. The remaining two thirds of the dozers work at 90 degrees to the direction of travel stacking the swath to the desired width. Control problems with this type of formation are greatly simplified.

### b. Road improvement

**ITEM:** Improving and widening of roads in jungle area controlled by the Viet Cong.

**DISCUSSION:** Improving and widening of roads in an area controlled by the Viet Cong presents both security and engineering problems. The possibility of mines and ambushes must be constantly faced.

**OBSERVATION:** On Operation Cedar Falls we worked on such a road in the following manner.



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13 Maximum distance between front and rear APC should be 80 meters. The Engineer Squad is available for any demolition work and as a ground reaction force if ambushed. The two lead dozers are used to improve the existing roadway, filling in all cuts and low spots. The two rear dozers widen and smooth out the road surface making it passable to wheeled vehicles. The APC can deliver immediate and rapid fire power which will force the Viet Cong to take cover. The formation should be kept tight as possible. No personnel on the ground should get in front of the two lead dozers, because of the danger of a mine detonating. This worked very successfully in an area that later was discovered to be abounding in Viet Cong.

### c. Conventional tunnel destruction

ITEM: Tunnel destruction with shaped charges.

DISCUSSION: Certain configuration of demolitions are preferred over other types for tunnel destruction. Shape charges are not the best type of explosive, since their explosive effect is concentrated and directional.

OBSERVATION: On Operation Cedar Falls an immediate shortage of demolitions required that we use some 40# shaped charges to destroy some small tunnels. To partially neutralize the Monroe effect, we packed the cone with C-4 to make the charge act as a block of explosive. It was primed with a two foot length of detonating cord with a cap crimped on each end. One cap was placed in the cap well and the other was placed in the C-4. One of these blocks was placed every 40 feet in the tunnel. The effect was still not as good as cratering charges but it was effective.

### d. Acetylene tunnel destruction

ITEM: Use of conventional explosives to supplement acetylene.

DISCUSSION: The acetylene method of tunnel destruction is generally effective for tunnels with seven feet overburden or less. On deeper tunnels, the overburden does not usually collapse, but merely fractures.

OBSERVATION: It was discovered on Operation Cedar Falls that use of satchel charges spaced at about 25 meters along the tunnel and detonated by a det cord ring main provided a valuable supplement to the acetylene method on deep tunnels. Using this combined method, tunnels with as much as 15 feet of overburden were completely collapsed.

### e. Quarrying operations

ITEM: Loading blast rock.

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DISCUSSION: Movement of blast rock from the quarry floor to the crusher site by dump trucks can be accomplished in a number of ways. A 40 ton crane with two cubic yard shovel attachment is effective, as is loading with a front loader. Both items of equipment are subject to excessive wear and tear from the sharp rocks and uneven surfaces inherent in quarrying operations. 14

OBSERVATION: A Chinaman loading chute cut into the rock floor of the quarry might prove to be a valuable alternate loading solution in the event that sufficient loading equipment becomes unavailable or dead-lined.

### f. Construction of non-standard buildings.

ITEM: Construction of 20' x 48' round wall quonset on a brick wall.

DISCUSSION: Because of their configuration with slanted walls and limited headspace, round wall quonsets are unsuited for use as storage rooms/supply rooms. Although it has a floor area of 960 square feet, the actual storage volume is unsatisfactory. However, this type of prefabricated building is well suited for storage. It keeps moisture and dust off, and can be temperature controlled without too much problem. In addition, the round wall quonset is the basic prefabricated building issued to engineer units to be used for warehouse/storage facilities.

OBSERVATION: Erection of a four foot brick wall and placement of the quonset on top was determined to increase the effective storage space by approximately 50%. No major construction problems were encountered, except for the availability of bricks.

### g. Construction methods.

ITEM: Placing insulation in ceiling of 20' x 50' metal building.

DISCUSSION: The 20' x 50' metal framed building specifies that insulation material be placed between the tin on the roof and the interior masonite on the ceiling. If the frame is erected according to instructions, and the exterior tin emplaced next, installation of the insulation materials becomes difficult. The insulation must be supported underneath the roof until the masonite can be placed in position and properly attached.

OBSERVATION: As soon as the roof trusses are emplaced, the interior masonite can be put in place by the normal method. Then, working from above, and insuring that the trusses are adequately braced, insert the insulation. The tin is then nailed down immediately, and chance of weather damage is minimal. Such an operation cuts construction time and effort appreciable, but is only applicable in the dry season.

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### h. Heliports

ITEM: Tactical heliports.

15 DISCUSSION: Army manuals indicate that 75' between helipad centers is adequate for the construction of operational heliports. However, in Vietnam, pilots frequently deviate from normal flying techniques by landing at higher speeds than usual, landing from formation flights, and varying approach directions to avoid setting up a pattern that could be ambushed. As a result, the standard distance is operationally inadequate, and a new minimum distance needs to be set for center to center spacing of helipads.

OBSERVATION: Inclosure 2 is a heliport layout which was designed to meet the operational requirements of the using unit. 110' was determined to be the minimum safe spacing between pads.

### 1. Pit operation

ITEM: Laterite pit.

DISCUSSION: The primary construction material in Vietnam is laterite, a sand-clay soil with iron deposits. Normally, this material must be hauled an average of one to three miles from its source to construction sites, and the efficient transport of this material is most important. Loading of laterite is restricted by the quantity of loading equipment available, invariably an item in short supply in Vietnam.

OBSERVATION: In areas where a large source of laterite is available, the construction of a chinaman/loading ramp will generally assure a reliable source of laterite. The construction of this ramp is most important, for it must absorb rather abusive use by its very nature. A design that this battalion has found to be suitable is Inclosure 3.

### j. Minefield operations

ITEM: Booby traps.

DISCUSSION: In recent combat operations it appeared that the enemy has sharply increased his use of mines, trip wires and booby traps. On many occasions, wires of unknown origin were detected by sweep units on operations. These wires were sometimes connected to anti-personnel mines, sometimes to a secondary mine, or often merely dummies. In almost all cases, the wires were located in areas that had to be assumed dangerous until proven otherwise, and measures taken had to fit specific tactical situations.

OBSERVATION: The safest method of exploring and neutralizing these wires and booby traps was by pulling the wires from a tank dozer or some other armored vehicle. All men involved in such operations should wear

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their flak jackets at all times, and obvious "cover" should not be used by personnel in the area, since such areas are frequently booby trapped.

### 3. TRAINING AND ORGANIZATION:

Shift of mission emphasis

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ITEM: Unit training prior to combat support mission.

DISCUSSION: The 168th Engineer Battalion had performed the missions and functions of a construction battalion for the past 15 months. When a major combat support mission was received, it was recognized that a certain degree of effort had to be given to retraining the units within the battalion. In this manner the battalion could be assured of a smooth transition from construction effort to combat support missions.

OBSERVATION: Steps taken to retrain the companies should include familiarization firing of all individual and crew-served weapons, by those individuals designated to be crew members. The entire unit should receive training in the fundamentals of demolition work, including booby traps, trip wire, etc. Special emphasis should also be placed on mine detector operation. All maintenance should be preventive in nature, pull wheels, pack bearings, etc. The unit should be thoroughly oriented on the type of mission, what to expect, and all other available information relative to the operation. All individuals who expect to be using radios should receive a class on radio procedure and proper communication techniques. Personnel with the unit should check their emergency data records, pack their equipment according to a minimum list prescribed by the company commander, and have this gear inspected. Finally, the unit needs a shakedown of one or two days of semi-actual operation, where the last kinks can be ironed out.

### 4. INTELLIGENCE.

Work site security.

ITEM: Requirements for properly securing a permanent work site.

DISCUSSION: Early in December, the decision was made to locate the bulk of the 557th Engineer Company (Light Equipment) at the quarry near Bien Hoa. Approximately 150 men were moved to this location, and because of the proximity to major US installations at Bien Hoa and Di An and the urgent demands for productivity, the original security perimeter was rather loosely knit. Soon the Viet Cong began to probe this perimeter, by fire, with claymore mines and increased harassment. As the harassment increased, the perimeter was gradually strengthened, somewhat piecemeal, until the position became a well fortified area.

OBSERVATION: When a unit is going to be permanently located in a position, no matter where it will be located and no matter what the

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17 operational demands, permanent defense positions should be of prime concern. The area should be completely covered with a fire plan, artillery concentrations should be located, tactical wire laid, defensive minefields emplaced and the area secured with added infantry support. Once such a position is emplaced, then work must begin on improvement. In this way, maximum security is achieved and maintained.

### 5. LOGISTICS.

#### a. Water supply

ITEM: Water supply in the field.

DISCUSSION: Use of the Erdlator in the field works extremely well except for the problem of raw water supply. At times no secure area was near a raw water source. Often times the security force required to establish a site outside the perimeter is not available.

OBSERVATION: This security problem was solved by using a 5,000 gallon fuel tanker to haul from a raw water source to the Erdlator which was set up in a secure area. The solution works very well, but it introduces another problem of the limited mobility of the 5,000 gallon water tanker.

#### b. Field sanitation.

ITEM: Field latrines.

DISCUSSION: Adequate latrine facilities in the field are a problem. If the operational requirement necessitates moving every three to four days, or even more often, much time is consumed digging adequate latrine facilities. Sanitation requirements make it essential to have a good latrine system in the field.

OBSERVATION: An adequate and efficient means of providing a field latrine was developed on Operation Cedar Falls. Use five gallon grease or oil cans, thoroughly cleaned out with both ends removed. Mount a wooden toilet seat on top of the can and bolt it to the can with some L-shaped brackets. This makes a small compact package for transport to the field. To dig the latrine hole, use a 40# shape charge. Place two short 3 x 12s over the hole and the five gallon can sitting on the planks. The result is a handy, rapidly constructed and sanitary field latrine.

#### c. Dozer maintenance

ITEM: Maintenance support of massed dozers in tactical operations.

DISCUSSION: In Operation Cedar Falls, this unit undertook the monumental maintenance task of maintaining more than 60 RD-16 and D7E dozers,

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plus a smattering of D-8s and TD24s. In jungle clearing operations, it was discovered that air intake and exhaust stacks, radiators, and hydraulic hoses and fittings of all types are particularly vulnerable to damage. Further, the dirty, hot operating conditions cause severe overheating problems. Under the tactical circumstances, however, dozer availability was vital to successful accomplishment of the mission.

OBSERVATION: Dozer radiators must be blown out by compressed air every hour or two, depending on working conditions. This can be accomplished by attaching a truck mounted compressor to each team of 8 to 12 dozers. Minor repairs, including soldering of punctured radiators, welding of braces and other components, and replacement of hoses and fittings can and should be accomplished in the field. This was done by attaching a contact truck and mechanics to each team. Major repairs require that dozers be evacuated to secure locations where lifting equipment and shop sets can be made available. These repairs were effected by a composite 2nd and 3rd echelon element located in a secure cantonment area approximately ten miles from the area of operations. In this manner, seriously deadlined dozers could be evacuated prior to darkness, repaired during the night, and returned for employment on the following morning. Under the foregoing system, the critical links are prompt diagnosis of the degree of maintenance problems, good communications and transportation for evacuating dozers as required, and immediate availability of repair parts. On Cedar Falls, the maintenance team was able to keep the deadline rate consistently below 10%, a truly outstanding achievement.

### d. Dozer maintenance

ITEM: Expedient radiator and grill repairs.

DISCUSSION: Radiators are especially vulnerable to damage from protruding branches and from booby trap fragments while engaged in jungle clearing operations. Solid plates are impractical for protection of the radiators, since these obstruct air passage and complicate the already severe overheating problems.

OBSERVATION: Minor punctures were repaired by soldering the ruptured lines. Whenever grills were bent or damaged, they were repaired or replaced by fabricated grills which served adequately in the absence of standard repair parts.

### e. Dozer maintenance

ITEM: Expedient repair of tilt cylinder hoses.

DISCUSSION: On Operation Cedar Falls, many dozers were deadlined for broken tilt cylinder hoses, which are especially vulnerable to snagging on stumps.

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OBSERVATION: A field expedient solution was developed whereby the tilt cylinder lines were blocked, and steel straps were welded between the dozer blade and the tilt cylinder housing. While this prevented blade tilt, it was very effective for the type of work involved.

### 6. COMMUNICATIONS.

#### a. Radio frequencies

ITEM: Frequency congestion.

DISCUSSION: During tactical operations, this unit became particularly cognizant of excessive frequency congestion, especially since the increased range of the new series radios causes greater range overlap than previously. Six different nets were consistently heard on the command frequency assigned to this battalion. These included an artillery battalion, an armed helicopter unit, a transportation terminal unit, and several undetermined administrative elements. On one occasion, this battalion was cut out by other traffic while attempting to call in a dust-off helicopter. On several others, we were blocked in the midst of fire-fights in which our units were engaged. Obviously, our transmissions sometimes created similar interference with artillery and gun ship fire missions.

OBSERVATION: Such frequency congestion is intolerable, and could well prove disastrous in a critical tactical situation. While the high demand for frequencies is recognized, something must be done to alleviate the problem, at least insofar as combat elements are concerned. On occasions, this battalion and other units operating on the same frequency requested priority from all other stations, but this was only partially successful. When one unit attempts to call a dust-off while another is conducting a fire mission, the priorities are irreconcilable to the units concerned.

#### b. Tactical radios

ITEM: Non-divisional engineer battalion radio communications are inadequate.

DISCUSSION: When operating in the field, in direct support of divisional engineers, the non-divisional battalion must maintain communications with the division engineer, the tactical unit responsible for the area of operations, to own subordinate units, and with its rear echelon on an administrative net. This requires, at a minimum, two VRC-47e at battalion forward headquarters, and at least one at battalion rear to transmit on the administrative net and monitor the Group net. At company level, similar contact must be maintained with supported and supporting units and with higher headquarters, requiring two VRC-47e and two VRC-46s at company level (one of each for the Company Commander and NCS); and one VRC-47 at platoon level.

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OBSERVATION: On Operation Cedar Falls, adequate communications could not be maintained, and several critical problems of coordination arose as a direct consequence of this failure. The only remedy available to this headquarters was borrowing additional radios, but this is not an adequate long term solution. Additional radios must be provided by special authorization.

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### Section 2, Part II, Recommendations

1. The direct support combat missions performed by this battalion in Operation Cedar Falls differed somewhat from previous combat support activities in that they involved the battalion headquarters and staff sections to a far greater degree than previous company and platoon-sized tasks. Also, the operation saw for the first time a composite dozer task force assembled from four battalions and two light equipment companies. Many of our lessons learned and minor recommendations are included in Part I of this section. There are, however, several significant matters which became evident during the operation, that are now being analyzed in detail by the battalion. These are worthy of special mention, and my preliminary recommendations are included in this section of the report.

2. First, as regards employment of non-divisional combat engineer battalions in a direct support role, there are several distinct advantages and several major problems which should be noted by all units so employed. The advantages of supply support available through divisional resources are indeed noteworthy, and should be recognized and fully utilized by direct support battalions not only while in the field, but also while preparing for the operation. Ammunition, fortification materials, field rations and similar items are relatively easy to obtain through divisional support units as compared to normal engineer supply channels. Likewise, the Division G-4 and Support Command have at their disposal tactical command channels which are invaluable in expediting delivery of critical materials. A second advantage attained in the direct support role is that of security. Previous combat support missions of this battalion almost invariably involved complicated coordination of security arrangements through many echelons of command. Even then, the results were sometimes very marginal. Under divisional auspices, security can be arranged quickly, easily, and adequately. Direct coordination with supporting units is encouraged, and in fact operates more freely because of the direct support relationship. Both of the aforementioned advantages are of substantial benefit to the engineer units involved, and they should be fully utilized. But there are also problems which occur by virtue of the direct support relationship. First, the unit is expected to comply with division policies which differ or even conflict with normal procedures. This can be resolved by prior coordination and reeducation. Second, and most important, an inevitable conflict arises between the field operations and the continuing MCA construction responsibilities of the direct support unit. It is virtually impossible to split the already undermanned staff of a non-divisional combat battalion with primary construction missions into two viable staffs. Likewise, each company-

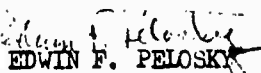
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sized unit must effect an unnatural split in order to conduct combat support and construction missions simultaneously. Something must suffer, and it is usually the construction effort. The ideal solution to this dilemma, of course, is to relieve the battalion from its construction responsibilities for the duration of the operation so that it can move to the field as an integral unit. Failing this, higher headquarters must accept reduced efficiency and productivity in the MCA program. One platoon from each line company is usually adequate to supervise indigenous employees and to keep the construction program moving at a reduced rate. The biggest problems arise in the operations and intelligence sections, where four officers cannot spread themselves thin enough to cover construction management, reporting, tactical planning and direction, security, intelligence, and coordination at two locations. I recommend: first, that selected non-divisional combat engineer battalions in each Group be relieved from their MCA responsibilities and directed primarily toward combat support activities; or, secondly, that two additional officers in the grade of captain and lieutenant be assigned to each battalion charged with a dual mission.

3. The novel task organization devised for Operation Cedar Falls integrated home plows, bulldozers, maintenance elements, and tunnel destruction teams into a manageable organization well adapted to direct support of tactical units in the attack. During the month-long operation, dozer teams generally supported battalion-sized infantry and armored units along with platoon or company-sized combat engineer elements. To the extent feasible, teams were provided an integral maintenance capability and were given backup support of all types from a central location, either by land or by air when tactical requirements so dictated. Each team had an officer in charge, with one or more non-commissioned officers as subordinate supervisors. On many occasions, however, teams were split by the tactical commanders to facilitate destruction of base camps or villages, and to construct landing zones. In these cases, it was not always possible to provide a supervisor with each segment, and productivity suffered severely. Further, the isolated elements had no capability for administration, logistics, or even communication. Such diversions from the overall clearing effort, while certainly understandable and even necessary from the viewpoint of tactical commanders, present serious control problems to the engineers. In any future operations of this type, the distinction between clearing operations and other combat engineer support should be defined more clearly. When clearing is paramount, appropriate security elements should be attached to the dozer teams rather than vice-versa. In any event, the control problems inherent in provisional organizations are so great that no further fragmentation should be permitted. Technical supervision and proper maintenance are the keystones to success of any clearing operation, and they cannot be ignored. Recommend that these facts be considered in planning future clearing operations, and that all tactical unit commanders be advised accordingly.

  
EDWIN F. PELOSKY  
Lieutenant Colonel, CE  
Commanding

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EGE-CO

1st Ind

26 February 1967

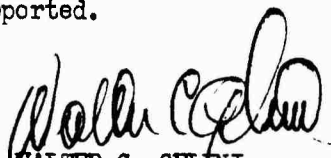
SUBJECT: Operational Report - Lessons Learned (RCS CSFOR-65), for the  
Quarterly Period Ending 31 January 1967

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whenever the unit is not committed to operational support. This construction mission can never entirely stop, even during heavy operational commitments. Beneficial occupancy dates for certain priority projects must be met and it would be undesirable to demobilize the civilian labor force. An alternative recommendation is submitted in lieu of the battalion commander's proposal to assign additional officers to the operations section: augment each combat battalion with the Combat Construction Section provided by paragraph 11, TOE 5-35E. This recommendation has been the subject of previous communications from this headquarters.

d. The analysis of the engineer utilization for missions in support of Operation CEDAR FALLS is excellent and I concur with the comments of the battalion commander. Copies of this report are being furnished to all subordinate battalions; the lessons learned should provide a good background for future coordination between engineer commanders and the units being supported.

3 Incl  
nc

  
WALTER C. GELINI  
Colonel, CE  
Commanding

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168th Engr Bn

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EGE-CO (14 Feb 67)

1st Ind

SUBJECT: Operational Report - Lessons Learned (RCS CSFOR-65), for the Quarterly Period Ending 31 January 1967

DA, HEADQUARTERS, 79TH ENGINEER GROUP, APO 96491, 26 February 1967

TO: Commanding General, U. S. Army Engineer Command Vietnam (Prov),  
APO 96491

1. The Operational Report - Lessons Learned for the 168th Engineer Battalion has been reviewed by this headquarters and is forwarded. The report is considered adequate; the unit has been requested to provide a separate section devoted to the 557th Engineer Company in the narrative portions of future reports.

2. The recommendations and comments of the battalion commander have been reviewed. I concur with his recommendations subject to the following comments:

a. This headquarters has long been aware of the serious frequency congestion existing in this theater. The communications personnel have worked closely with the communications section of U. S. Army Engineer Command Vietnam to obtain frequency changes when the interference became intolerable. The ultimate solution to this problem, if there is one, can only come from actions taken at the highest levels of command.

b. The problem of maintaining communications not only with higher and subordinate units, but with the tactical unit being supported is recognized. A solution currently being used is to allow the battalions to operate and monitor two frequencies: the net with the subordinate units and the net with the supported units. For messages from group to battalion the group enters the battalion command net and requests the battalion to take a message on the group frequency. For transmissions from battalion to group, the battalion enters the group net.

c. The dual role played by the non-divisional battalions in this theater and the problems inherent in carrying out both combat and construction tasks have been outlined quite well by the battalion commander. With the heavy engineer workload in this theater it is essential that all engineer units continue their construction mission

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not be later than 12 February 1970.

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AVHGC-DH (14 Feb 67) 3d Ind  
SUBJECT: Operational Report-Lessons Learned for the Period Ending  
31 January 1967 (RCS CSFOR-65)

27 MAR 1967


HEADQUARTERS, UNITED STATES ARMY VIETNAM, APO San Francisco 96307

TO: Commander in Chief, United States Army, Pacific, ATTN: GPOP-OT  
APO 96558

1. This headquarters has reviewed the Operational Report-Lessons Learned for the period ending 31 January 1967 from Headquarters, 168th Engineer Combat Battalion as indorsed.

2. Concur with the comments contained in the basic report, as modified by 1st and 2d Indorsements.

FOR THE COMMANDER:

  
R. J. THORNTON III  
1st Lt, AGC  
Asst Adjutant General

1 Incl  
nc

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GPOP-OT(14 Feb 67)

4th Ind

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SUBJECT: Operational Report-Lessons Learned for the Period Ending  
31 January 1967 (RCS CSFOR-65), HQ 168th Engr Cbt Bn

HQ, US ARMY, PACIFIC, APO San Francisco 96558 28 Apr 1967

TO: Assistant Chief of Staff for Force Development, Department of the  
Army, Washington, D. C. 20310

This headquarters concurs in the basic report as indorsed.

FOR THE COMMANDER IN CHIEF:



3 Incl  
nc

H. SNYDER  
CPT, AGC  
Asst A

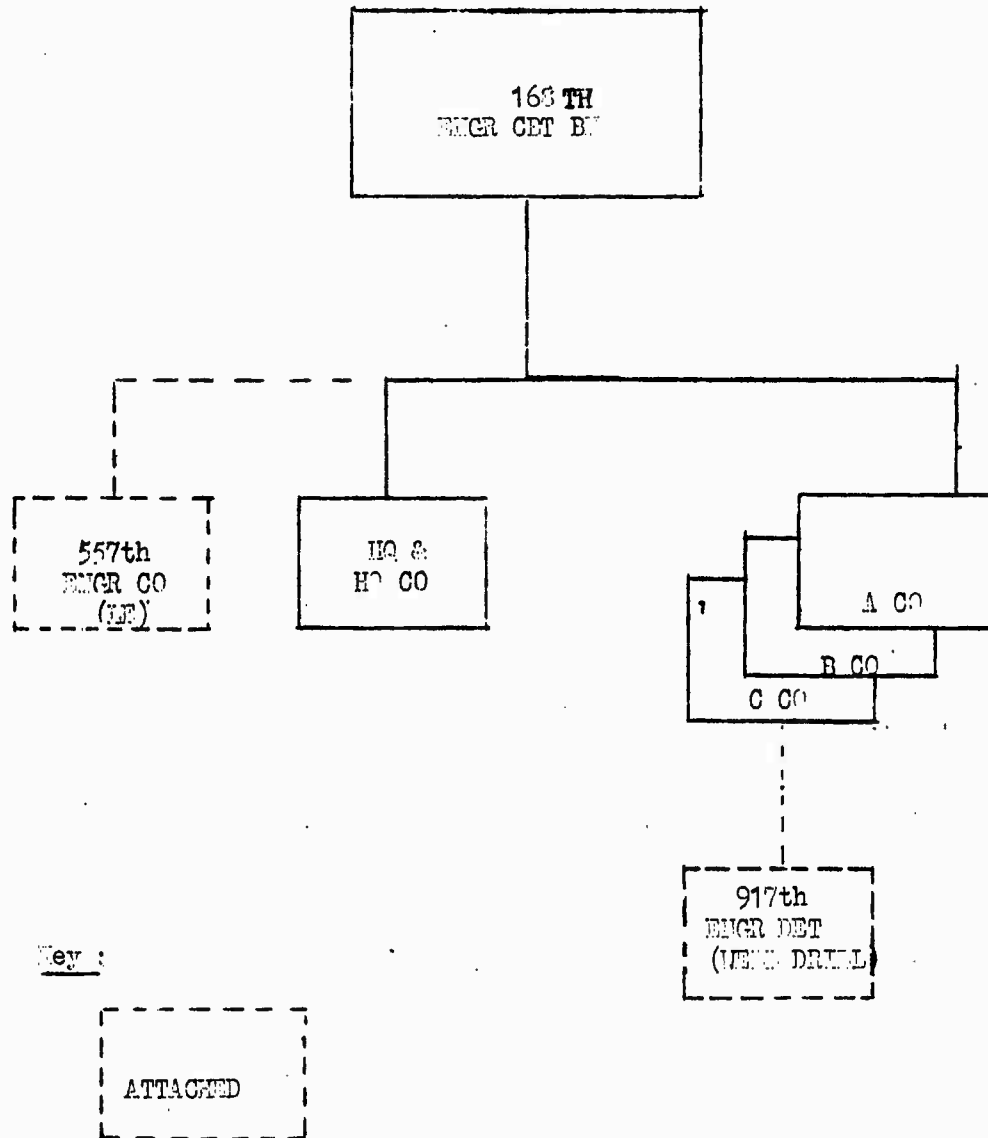
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the protected material

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Inclosure 1 to Operational Report-Lessons Learned for the Quarterly Period  
November 1966 thru January 1967

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## TACTICAL HELIPAD

29

2

Single row of  
55 gal drums,  
2 high, 20'  
long, filled  
w/water

Roads and  
Helipads are  
Connected

Single lane  
road

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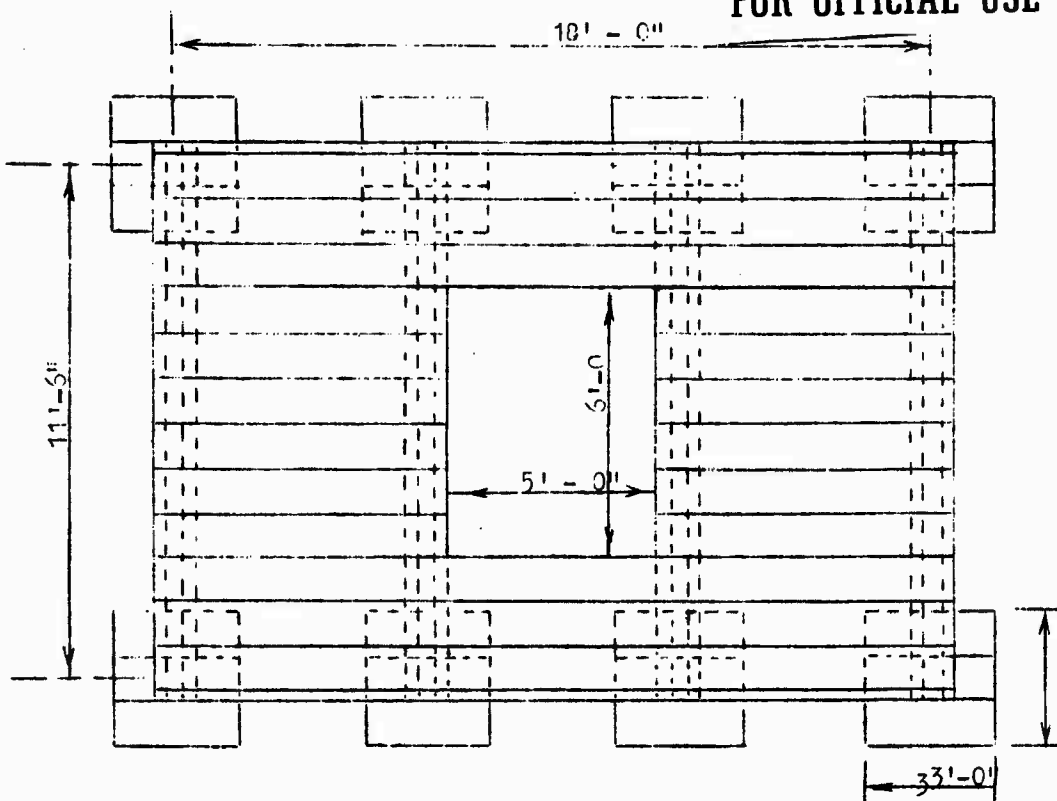
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November 1966 thru January 1967

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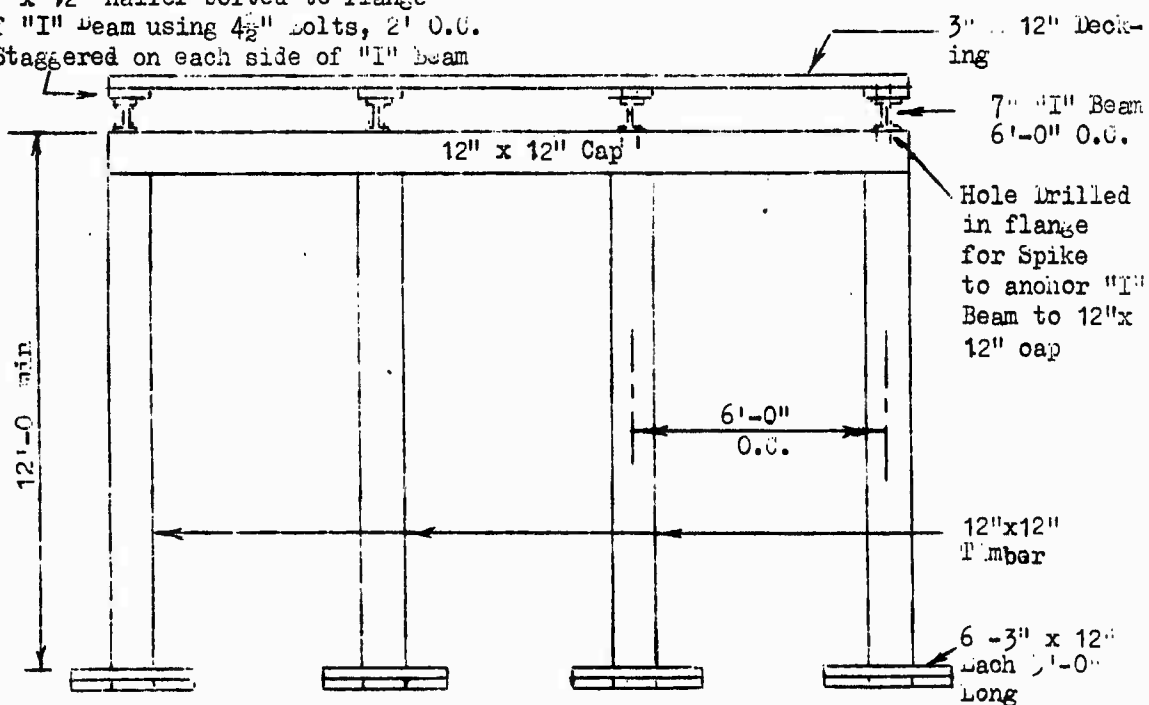
C. INAMAN

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31



3" x 12" nailer bolted to flange of "I" beam using 4 1/2" bolts, 2' O.C. Staggered on each side of "I" beam



NOTE: Columns should be held in place by braces or deadman. Vehicle to drive under 5'x6' drop chute. Columns should have 3'x3' footers if wood is used for footers.

1 cl 3 to Operational Report-Lessons Learned for the quarterly period November 1966 thru January 1967

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